October 16, 2002

EMERGENCY MANAGEMENT TABLETOP EXERCISE REPORT

Serious Injury at the Accelerator Site

PURPOSE

This is a report of a tabletop exercise conducted at Thomas Jefferson National Accelerator Facility on July 18, 2002. The purpose of the exercise was to test the knowledge of accelerator crew chiefs and accelerator operators regarding their responsibilities for emergency response, emergency communications, and site security. In addition, some emphasis was placed on determining their knowledge about laboratory-wide emergency response capabilities and responsibilities. Finally, because all available crew chiefs and accelerator operators attended the exercise, some training was both inevitable and desirable. On a separate theme, this exercise served as a training experience for Mike Lewellen, who is scheduled to be emergency management exercise controller in FY 2003.

PREPARATION

Accelerator Operations Department requested a tabletop exercise for crew chiefs and accelerator operators to be conducted in July 2002 during a major shutdown. The Accelerator Division EH&S Manager requested participation by the Emergency Management Manager and the Emergency Management Subcommittee (EM). Appendix A contains lists of the staff on the exercise planning group (EPG), crew chiefs and accelerator operators who participated, and observers. The observers listed brought expertise to the exercise and were available to respond to questions by participants. Their participation added greatly to the exercise and is appreciated. The EPG held formal meetings on the following dates: June 13, June 20, June 27, and July 9. The exercise was originally scheduled for July 10, but maintenance activities forced a delay until July 18.

During the planning period, the EPG developed the exercise scenario, a set of exercise rules to be given to all participants, and a set of questions to be directed to individual participants. Appendix B is the original scenario used to develop the lines of questioning. Appendix C is the list of rules given to the participants at the start of the exercise, and Appendix D is the set of questions (with "text book" answers) used during the exercise to promote thought and discussion. The question set was organized by topics and questioners; the questioners being indicated by their initials:

Guidelines, Scenario, and Introduction – T. Hassler (TH)
Operations and Communications – R. Dawes and M. Spata (MS)
Medical – S. Prior (SP)
Corporate and Legal – D. Dowd (DD)

Coordination of question development and content was facilitated by use of a share folder on computer M drive. This capability allowed EPG members to follow each other's line of questioning on a continuous basis and reduced the need for meetings.

SCENARIO

The scenario outlined in Appendix B evolved during the exercise planning process as a result of discussion and the creation of new ideas. The scenario used during the exercise was presented piecemeal as the line of questioning proceeded and is indicated by italics in Appendix D. The scenario used included the following key points.

A subcontractor working on the roof of the South Linac Service Building falls to the ground on the backside of the building. This occurs at 1830 on a June day.

The victim's only co-worker calls 911 on his cell telephone, which bypasses our crisis alert system.

The City of Newport News 911 Center calls the Gate Guard to verify the call.

The guard has no prior knowledge of the call, and calls MCC.

An ambulance shows up at the gate, and the driver tells the guard, who tells the Crew Chief, that the person who fell is at the accelerator site.

The ambulance waits at the gate for an escort onto the accelerator site.

Two operators and the Roving Guard have been dispatched to search for the victim and then relay the exact location back to the Gate Guard and ambulance.

An operator searching the site locates the injured man. The co-worker says the man tripped and fell from the roof.

At this point, participants are presented two alternate situations:

1. The victim's face is very pale, but he is coherent. He tells you that when he fell, he landed on his hands and chest and believes he has broken both wrists. His right ankle also hurts and may be sprained or broken. He has multiple bruises to his torso.
2. The victim landed face down. He does not respond to touch or questioning. He does not appear to be breathing. No appendage appears to be broken.

EXERCISE

The exercise scenario and line of questioning exposed the participants to several difficult questions that required creative thought and resulted in lively discussions:

- When can a 911 call made on site not trigger the crisis alert system?
- What is the optimum way to search the site for an unknown, unresponsive person?
- Under what circumstances should staff move a person with a potential spinal injury?
- How can the security guard force be best used during an emergency inside the fence?
- How does a work-related fatality affect immediate and follow-up response in comparison with immediate and follow-up response to a serious injury?
- How do we know that the victim's fall was caused by accidental tripping rather than because of a medical emergency, such as fainting, or by being pushed by an angry co-worker?

We attempted to limit discussion to defining problems clearly and accurately. The impulse to solve problems was kept in check for the most part and left for line management to address. The exercise resulted in the seven observations and recommendations that follow.

OBSERVATIONS AND RECOMMENDATIONS

1. Observation: No one is tasked to determine the destination of an ambulance transporting a patient from the site. It is very helpful to all concerned if Human Resources can report the name of the intended receiving hospital or clinic when it notifies the next-of-kin of the injury.
   Recommendation: It is recommended that the Security Manager modify the guards' procedures to require they ask exiting ambulance drivers their destination prior to opening the gate.
   Status: This requirement was added to the MCC operator-response flow diagram. The operator on the scene should ask this question. Added to Security guard procedures: After normal work hours - when an emergency has occurred and the ambulance is departing the Accelerator site, ask the driver his/her destination (hospital) prior to opening the gate. If the emergency is located on the Campus site, have Post 1 or 3 Mobile guard ask the ambulance driver his/her destination (hospital) upon leaving. Complete.

2. Observation: The Machine Control Center had insufficient pocket masks for administering rescue breathing by multiple rescuers to multiple victims.
   Recommendation: Order additional masks and store properly.
   Status: The masks were ordered, received, and are available for use. Complete

3. Observation: The Machine Control Center had insufficient cellular telephones to conduct business properly during the exercise.
   Recommendation: Order additional cellular telephones.
   Status: The operators now have two new cell phones, and their use has been inserted into the revised Accident/Incident Response flow chart. Complete.

4. Observation: The Central Alarm and Notification System (CANS) is currently not set up to provide MCC with the names of everyone who is inside the fence on a real-time basis.
   Recommendation: Change CANS so that it can provide on demand the names of everyone who has checked in but has not checked out at the guardhouse.
   Status: Software programming is in progress for CANS to meet this requirement for the experimental halls and the accelerator site.

5. Observation: Emergency management procedures for operators, including the Incident/Injury flow diagram, did not address all issues raised by this exercise.
   Recommendation: Revise the procedures and provide training.
   Status: A new operator-response flow diagram has been released based on the lessons learned from the exercise. Hard copies of the new document have been added to the control room emergency response binder, and the document is available online at: http://opsntserv.acc.jlab.org/ops_docs/online_document_files/MCC_online_files/injury_re:
   Complete.

6. Observation: Some participants did not seem aware that some information that can arise during an emergency is too sensitive to be included in the eLog.
   Recommendation: Provide operators with guidance about protecting the privacy of individuals and other sensitive issues when making eLog entries.
   Status: A cautionary note was included in the new flow diagram, noting that such information should not be mentioned over two-way radios, cell phones, in the Elog, or anywhere else that is publicly accessible. Complete.

7. Observation: The guards and the crew chief have independent lists of staff to contact depending on emergency type and location. This can lead to duplication of effort or overlooking someone who should be notified.
   Recommendation: Coordinate the two lists and share the information between the guard force and MCC crew chiefs and accelerator operators.
   Status: The Emergency Call Roster used by the Security Guard Force is under review, and changes have already been made to reduce the number of persons the guards to call during non-business hours. Physics and Accelerator are update their lists of staff to be called and are replacing home telephone numbers with pager numbers and cellular telephone numbers. Mike Spata and Mike Lewellen are working to produce an efficient, coordinated notification process.

APPENDIX A

Individual Participants

Exercise Planning Group	Question Areas
Richard Dawes*	Operations and Communications
Deborah Dowd*	Corporate and Legal
Tom Hassler*	Guidelines, Scenario, and Introduction
Mike Lewellen*	Security
Sandy Prior	Medical
Mike Spata	Operations and Communications

* Member of Emergency Management Subcommittee

Exercise Participants	
Robert Adams	Accelerator Operator
Terry Carlino	Accelerator Operator
Michael Epps	Crew Chief
Harry Fanning	Crew Chief
David Green	Accelerator Operator
Roger Housman	Accelerator Operator
Zafer Kursun	Accelerator Operator
Monty Lehmann	Crew Chief
Jacque Ludwig	Crew Chief
Scott Myers	Accelerator Operator
Leon Reynolds, Jr.	Accelerator Operator
Darrell Spraggins	Accelerator Operator
Ken Surles-Law	Crew Chief
Kelly Teague	Accelerator Operator
Paul Vasilauskis	Accelerator Operator
Yan Wang	Crew Chief

Observers	
James A. Davies	Top Guard Security
Mark Jones	Top Guard Security
Deborah Magaldi	Director's Office
Robert Nickerson	Top Guard Security
Tom Oren	Operations Administration
Nicholas Rivera	Top Guard Security
Linda Ware	Director's Office

APPENDIX B

Accelerator Operator Tabletop Exercise Scenario

Type of Exercise:	Serious Injury
Purposes of Exercise	To exercise accelerator operators on responding to a serious injury on site after normal business hours To evaluate existing emergency response procedures To train selected staff on conducting a tabletop exercise
Exercise Planning	An Exercise Planning Group (EPG) composed of Sandy Prior, Tom Hassler, and one or two members of the Emergency Management Subcommittee will form and establish the detailed sequence of situational events and the list of questions that pertain to the situation. Members of the EPG will act as facilitators during the exercise.
Location:	The exercise will be conducted in a conference room. The injury will be said to occur in a remote location on the accelerator site.
Timing	The exercise will be conducted on a day and at a time mutually agreeable to all involved. The week of July 8 is scheduled for maintenance and is a possibility because operators should not be on shift work.
Exercise Initiation	Participants will be seated in a conference room and will be given useful information, such as: exercise rules, names of the facilitators, and initial conditions at the start of the exercise. The facilitators will in turn ask questions that lead the participants through a scenario and reveal their knowledge of emergency response procedures.
Ground Rules	Questions will be directed to one person at a time. After that person gives a correct or nearly correct answer, the questioner may ask if anyone else wants to elaborate. If the answer is inadequate, clearly wrong, or "I don't know", the questioner will ask a second person. After two misses, the questioner may open up the question to anyone.
Situation (possible)	It is 1730 on a business day in June. Beam is going to Halls A and B. Nothing special is scheduled for the shift. The weather forecast is for clear skies, wind 5 to 10 MPH, warm temperatures, and humidity 50%. The only work going on is physics is moving some shielding blocks from the lay-down yard into Hall C, and MRI is trying to fix an air conditioner on Building 2.

APPENDIX C

Tabletop Exercise for Accelerator Operators
July 18, 2002
MCC Conference Room

General Information

Tabletop exercises have some advantages over field exercises: They are not affected by weather and you can stop action, fast forward, or rewind. Also, you can try alternative solutions to problems and multiple situations. Everyone will hear what goes on in this room today, whereas in a field exercise, you know what is going on where you are, and that is about it. The main disadvantage of a tabletop exercise is that you do not get to test your equipment and procedures. We think you will see that a tabletop exercise is just another way of training and learning. I think you will find that this type of training complements the other types of training with which you are more familiar.

Ground Rules

Questions will be directed to an individual. That person may answer the question or pass. If the answer is wrong, incomplete, or the person passes, the question will be directed to the next person. If the second person's answer is anything other than complete, the question will be opened up for discussion.

For each question, you will be told whether you are acting as crew chief or as beam operator. Also, when questioned, you may use any document normally kept in the MCC control room.

Initial Conditions

It is 1830 on a business day in June. Beam is going to Halls A and BNothing special is scheduled for the shift. The weather forecast is for clear skies, wind 5 to 10 MPH, warm temperatures, and humidity 50%.

APPENDIX D

QUESTIONS

(TH) Suppose that you are the crew chief, and you receive a call from the gate guard who tells you excitedly that the 911 center called and said that they received an emergency call saying that someone had fallen off a roof at Jefferson Lab. The guard wants to know if you know anything about this. He is supposed to verify the report.

Questions for a Crew Chief

Q1a: (TH) What do you tell the guard, and what thoughts go through your mind?
A1a: You tell the guard that you know nothing about it. Thoughts: Who is the injured person? How badly is the person hurt and what injuries were sustained? Where is the person? What happened? What happened to 911 Alert?

Q1b: (TH) The guard tells you that an ambulance and a fire truck are at the gate, and the guard wants to know where to send them. What do you do?
A1b: Tell the guard to ask the responders what precisely they were told by the 911 Center. What indicates that the injured person was inside our fence? Was anything mentioned about the building or location.

Q1c: (TH) Name the reason(s) you can think of that would explain why a 911 call made on site would not activate our crisis alert system?
A1c: The 911 alert system is broken. The call was made from a pay telephone. The call was made from a cellular telephone.

Q1d: (TH) Why does a fire truck nearly always accompany an ambulance?
A1d: Primarily for transportation back to the fire station. Some procedures require four responders. You cannot put four responders and a patient in an ambulance.

(TH) The guard tells you that the ambulance driver says that the 911 Center received a call saying that someone fell off a roof at Jefferson Lab at the accelerator.

Q2a: (TH) What do you do with this information?
A2a: I will send my two assistants out to find the victim.

Q2b: (MS) What equipment will you have them take with them?
A2b: Two-way radios/cell phones, paper and pen, first aid box, AED.

Q2c: (MS) Discuss searching the accelerator site for this person. Where do you send them, and what do they look for?
A2c: I would split the two people up, one taking north side and one south side of CEBAF Blvd. Coordinate with the roving guard(s) to avoid going over the same ground. Look for a ladder to the roof of any building.

APPENDIX D

(MS) The operators search around the site and one reports back that a man is on the ground about midway on the far side of Building 2, the South Linac Service Building. His co-worker says that the man tripped and fell from the roof.

Situation 1: (SP) The victim's face is very pale, but he is coherent. He tells you that when he fell, he landed on his hands and chest and believes he has broken both wrists. His right ankle also hurts and may be sprained or broken. He has multiple bruises to his torso. The ambulance is at the gatehouse. The second roving guard will provide escort.

Questions for an Accelerator Operator

Q3a: (SP) Assuming you were the operator who arrived first at the scene, would you render emergency care for the victim? Explain why or why not.
A3a: No emergency care is needed at this time since the victim is alert and talking. If you have the first aid kit with you, you may want to provide some "comfort" care such as an ice pack for swelling. However, current thinking for treating a serious injury is ABCDE: Airway – check for obstruction; B – Breathing – is the victim breathing; Circulation – if the victim has evidence of circulation than he/she has a pulse and CPR is not warranted. If no pulse, begin CPR; Defibrillation – early defibrillation to get the heart functioning is critical; and, Early Advanced Care – ambulance arrival. Since the victim is talking, he obviously has no airway obstruction; he's breathing and has a pulse.

Note: At JLab, only Medical Services staff are required to administer first aid. JLab staff are encouraged to become proficient in first aid skills; however, Red Cross first aid classes & certification are no longer offered at the lab due to budget concerns. CPR and AED training is provided through JLab's Medical Services staff.

Q3b: (SP) If you answered yes to Q3a, what would be your immediate action?
A3b: Assess airway, breathing, and circulation. Maintain the scene. Do not attempt to move the victim since he may possibly have a bone fracture, spinal injury, or other unknown injuries. Send the victim's co-worker to flag down the ambulance and direct them to the victim.

Q3c: (SP) While you are waiting for the ambulance, you try to keep the victim's mind off his injuries by engaging him in conversation. All of a sudden, you notice that the victim appears to have dozed off. What would you do?
A3c: Tap on the victim's shoulder and call to him. If you get no response, assess for airway obstruction, breathing, and circulation. If he is not breathing, start rescue breathing (don't forget your mouth shield in the first aid kit). If he does not have signs of circulation, begin CPR.

Note: Checking for a pulse is no longer the correct method for determining if a victim is in cardiac arrest. Studies showed a 15% error rate among medical professionals who

incorrectly thought they felt a pulse and did not administer CPR/defibrillation. Starting CPR even though the victim has a pulse will not do harm to the victim. The AED, when set up, will monitor for a pulse and will not administer a shock if a pulse is detected.

Statistic: One out of every 100 people do not get CPR because responder thought there was a pulse and there wasn't.

Situation 2: (SP) The victim landed face down. You tap on him and ask if he is OK. He does not respond to your calls. He does not appear to be breathing. No appendage appears to be broken.

Q3d (SP) Would you render emergency care for the victim? Explain why or why not.
A3d: Yes. The absence of breathing is a greater concern over the potential harm you may do by rolling over a victim with a potential bone fracture, spinal injury, or other unknown injuries. Rescue breathing and, if needed, CPR are essential to the victim's survival.

Q3e: (SP) How would you verify whether or not the victim was breathing?
A3e: Again, you tap on the victim's shoulder and call to him. If he does not respond, you look for his chest to rise and fall. If you see no evidence of breathing, you begin rescue breathing.

Q3f: (SP) If yes, what types of things would you need to pay attention to as you rolled the victim onto his back?
A3f: You would want to try and immobilize his neck and spine the best you could. Remember though, you are not trained on the proper technique and are not expected to know how to properly immobilize a victim with a potential spine injury. The most important issue for the victim's survival at this point is to start rescue breathing.

Q3g: (SP) Do you need to take any further precautions before you start rescue breathing?
A3g You may not want to extend the neck when you begin rescue breathing, if possible, due to the concern for neck injuries. Look for the chest to rise as you administer two breaths to ensure there is no airway obstruction. If the chest does not rise, establish the airway and try again. If still no air into the lungs, look for an object in the mouth, re-establish the airway, and give two more breaths.

(SP) Ok, you are starting rescue breathing.

Q4a: (SP) What are the steps you would follow? (Remember, you have the First Aid kit from the MCC with you)
A4a: You get the mouth shield from the first aid kit.
You check for airway obstruction – head tilt and chin lift
Give two breaths w/mask to cause chest to rise and fall.
Look for signs of circulation – body movement, skin color

APPENDIX D

If no signs of circulation, then start CPR. If there are signs of circulation, continue with rescue breathing. Check periodically for breathing (look, listen, feel).

Q4b: (SP) How do you know the victim is not in cardiac arrest?
A4b: You see signs of body movement (i.e. finger twitching) or skin color is good – no discoloration.

Q4c: (SP) So you aren't sure if the victim's heart is beating. How would you check?
A4c: You look for signs of circulation. Checking for a pulse is no longer an accepted method. However, it's OK if you want to try and take a pulse, but remember, this is an unreliable method and when in doubt, start CPR. You will not hurt the victim if you start CPR and there is actually a pulse.

Q4d: (SP) You are kneeling beside the victim to his right side. You've already given him two breaths and now you need to determine if he is in cardiac arrest. You do this by reaching across to the left side of his neck and placing your index and middle fingers between the victim's Adam's apple and muscle. You think you feel a pulse but looking at the victim, you think he looks pretty lifeless. What would you do?
A4d: First, you have taken the pulse incorrectly. A Pulse should be taken on the same side of the victim's neck that you are on. Do not reach across to the other side. Again, when in doubt, start CPR. You will not hurt the victim if you start CPR and there is actually a pulse.

Q4e: (MS) What is the best way to get the ambulance to the victim.
A4e: Between building 82 (W1) and building 02 (SL). Sometimes there are things stored on the pavement at this point. If access is blocked the Ambulance will go between the end of building 02 (SL) and the transportainer. (Fifteen feet clearance)

Q4f: (SP) You hear the ambulance crew arrive on the other side of the building. You know a shortcut from the front side of the building to the backside. Should you stop CPR and go get them? What could you do?
A4f: No. Don't stop CPR until:

- You are relieved by someone else who will continue CPR
- You are instructed to stop by a member of the advanced care team (EMT, nurse, doctor)
- You are too tired to continue

Q4g: (SP) The ambulance crew reaches you and the victim. You tell them the victim is in cardiac arrest. One EMT kneels down beside the victim and begins attaching the defibrillator to the victim. At what point would you stop CPR?
A4g: Stop when the EMT tells you to stop and to stand clear for defibrillation.

APPENDIX D

(*MS) The Crew Chief is busy back at MCC while the Emergency Medical team is attending to the victim.*

Questions for the Crew Chief

Q5a: (MS) Whom do you notify and what do you tell them (Situations 1 and 2)?

Situation 1: (SP) The victim's face is very pale, but he is coherent. He tells you that when he fell, he landed on his hands and chest and believes he has broken both wrists. His right ankle also hurts and may be sprained or broken. He has multiple bruises to his torso. The ambulance is at the gatehouse, waiting for the roving guard to provide escort

Situation 2: (SP) The victim landed face down. You tap on him and ask if he is OK. He does not respond to your calls. He does not appear to be breathing. No appendage appears to be broken.

A5a: In both situations you pass this information along to the associate director in charge when he/she arrives. Relevant information about the victim's condition should be reported, but names or other personal information should not be reported over the walkie-talkies.

Q5b: (MS) Who is in charge?
A5b: The Crew Chief is the Associate Director in Charge unless relieved by senior management. The senior emergency responder from City of Newport News is called the Incident Commander and considers himself/herself in charge.

Q5c: (MS) What do you want each person notified to do (scenarios 1 and 2)?
A5c: Initiate their emergency response directives.

(MS) The ambulance is at the scene, and the EMTs have taken over patient care.

Q6a: (MS) What do you want your operators to do?
A6a: Stand by to assist EM staff and or guards in rendering first-aid and securing the scene. Report all events to the Crew Chief.

Q6b: (MS) What do you want the guard force to do?
A6b: Report back to MCC all events for logging purpose.
Have them standby to direct traffic.

Q6c: (MS) Under what circumstances in either situation would you take the accelerator to Power Permit or safer status?
A6c: If no one is left in the control room to monitor the systems.

APPENDIX D

Q6d: (MS) One of your guards reports that the co-worker is packing up his stuff and appears to be preparing to leave. What do you do?
A6d: You ask the guard to request the co-worker not to leave until the authorities have interviewed them.

Q6e: (MS) Could this be anything other than an accident?
A6e: The person could have had a medical problem such as a heart attack or epileptic seizure that caused him to fall. The co-worker could have pushed him intentionally or bumped him unintentionally.

Q6f: (DD) Should the victim's company be notified? Who should do this?
A6f: The contract administrator (JLab staff) should make contact the company. If not possible, the facility manager is an alternative.

Q6g: (DD) Who should notify the victim's next of kin?
A6g: This would be the responsibility of the Contractor. Since this person is not a JLab employee, we can provide no information regarding identity, condition, etc.

Q6h: (DD) The company's owner calls MCC and wants to come to the lab and observe the scene and talk to the co-worker. What do you tell her?
A6h: If a call has been made from the contract administrator or facility manager to the contractor, this may be an appropriate course of action. You should tell the owner to report to the guardhouse where her identity would be verified and she could be escorted to the scene.

Q6i: (DD) Under what circumstances would you expect the City of Newport News Police Force to show up on site?
A6i: Police may be called by the Fire Department; if not, our security staff could call the police.

Q6j: (DD) How should information about the incident be handled?
A6j: Information about the incident is handled depending on the audience. Press is referred to Linda Ware, Public Affairs. The DOE will learn information through Carter Ficklen, and SURA would get information from the Director or his designee.

Q6k: (DD) The guard calls you and reports that there are two television reporters, a camera lady, and a newspaper reporter at the gate. They want to go to the scene. What do you tell the guard?
A6k: You would have these people remain at the guard shack for Linda Ware or her designee to come to the guard shack and escort them on site. An office or conference room may be set up to allow them to wait for timely updates for their stories without getting in the way of medical or rescue personnel.

APPENDIX D

Q6l: (DD) The phone rings, and it is a women who says she is the wife of the injured man, and she demands to know what happened to her husband, and if you don't tell her she is calling a lawyer, the police, and CNN.
A6l: (This is really a reporter.)You would have to tell her that we cannot provide any information and defer to the contractor company. If she is really the wife, she'll contact her husband's boss and get the info she needs.

Q6m: (DD) How will you find out where the victim was taken in the ambulance?
A6m: You have to ask the driver before they depart. It gets difficult if you forget to do this because of privacy. Hopefully, the company owner or the co-worker will follow the ambulance. You should have gotten their cell phone numbers for other reasons; so call them if you did not get the information from the medics.